

- HOWARD, H. W. 1947. Wild and Cultivated Watercress Types. *Agriculture*, 53: 453-456.
- HOWARD, H. W. AND A. G. LYON. 1950. The Identification and Distribution of the British Watercress Species. *Watsonia*, 1: 228-233.
- HOWARD, H. W. AND I. MANTON. 1946. Autopolyploid and Allopolyploid Watercress with the Description of a New Species. *Ann. Bot.* II, 10: 1-13.
- KITAMURA AND MURATA. 1961. Coloured Illustrations of Herbaceous Plants of Japan (Choripetalae): 177.
- MUENSCHER, W. C. 1944. Aquatic Plants of the United States: 254.
- MURLEY, MARGARET R. 1951. Seeds of the Cruciferae of Northeastern North America. *Amer. Mid. Nat.* 46: 1-81.
- SCHULZ, O. E. 1934. Neue Cruciferen aus Südamerika. *Notizbl. Bot. Gart. Berlin*, 12: 39-41.
- SHAW, H. K. Airy. 1948. The Botanical Name of the Wild Tetraploid Watercress. *Kew Bull.* 1947: 39-46.
- . 1951. A Binary Name for the Hybrid Watercress. *Watsonia*, 2: 73-75.

## A NEW SPECIES OF *SCIRPUS* IN THE NORTHEASTERN UNITED STATES

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While collecting leafy species of *Scirpus* in the Connecticut River valley through Vermont, Massachusetts, and Connecticut during the summer of 1960, I was surprised to find a population of plants which did not conform to any descriptions in the standard manuals for this region (Fernald, 1950; Gleason, 1952). Vegetatively the plants appeared very similar to *Scirpus atrovirens* Willd., which is widespread in eastern North America. However, an examination of the comparatively large achenes and rigid perianth bristles revealed some striking differences from *S. atrovirens*, and later, other differences were discovered. Also, more specimens of this taxon were found in herbarium folders containing specimens of *S. atrovirens* and its relative, *S. polyphyllus* Vahl.<sup>1</sup> Because of its well-marked distinctions from previously recognized species of *Scirpus*, I herein describe it as a new species.

<sup>1</sup>I am indebted to the curators of the following herbaria where I visited or obtained loans: Gray Herbarium, University of Massachusetts, Dartmouth College, New York State Museum, Wiegand Herbarium, New York Botanical Garden, Pennsylvania State University, Philadelphia Academy of Natural Sciences, U. S. National Museum, University of Michigan, and Missouri Botanical Garden.

*Scirpus ancistrochaetus* sp. nov.

Culmi 0.8-1.2 m. alti, foliis inferioribus usque ad 8 mm. (10 mm.) latis. Spiculae glomeratae; squamae spicularum vix mucronatae, illis medianis 1.55-1.90 mm. longis. Setae 6, 1.1-1.7 mm. longae, rigidae, fere usque ad basim dentibus retrorsis crassis acribus armatae. Fructus 1.10-1.35 mm. longi, fere omnes obovati, parte supra cavum seminis lenta et crassa.

Plants perennial, producing flowering culms from short, woody, underground rhizomes; lateral buds of the rhizome producing erect shoots which break through the subtending leaf sheaths. Flowering culms 0.8-1.2 m. tall; *lower leaves up to 8 mm. (rarely 10 mm.) wide, 40-60 times as long as wide*; uppermost leaf 3-5 mm. in width, 30-50 times as long as wide; lowermost involucral bract 3-5 mm. in width, 5.5-17.0 cm. in length. Inflorescence rays up to 6.3 cm. long, bearing clusters of brown spikelets. *Scales slightly mucronate, those from the central portion of the spikelet 1.55-1.90 mm. long. Bristles 6, 1.1-1.7 mm. long, rigid, armed almost to the base with thick-walled, sharp-pointed, retrorse teeth.* Stamen number variable, between 0 and 3. Styles 3-parted, up to 1.35 mm. long. *Fruits yellow-brown, 1.10-1.35 mm. long, mostly obovate, the portion above the seed cavity tough and thickened.* "Oil layer" of the seed with cell walls inconspicuous as a result of abundant pits.

TYPE LOCALITY: VERMONT: Windham Co.: 5 mi. n. of Bellows Falls, e. side of rt. 5, small population along margin of pool, July 3, 1960, A. E. Schuyler 3051 (MICH, type); Aug. 11, 1960, A. E. Schuyler 3298 (MICH); Aug. 12, 1961, A. E. Schuyler 3445 (MICH).

ADDITIONAL LOCALITIES: PENNSYLVANIA: Lackawanna Co.:  $\frac{3}{4}$  mi. w. of Fleetville, east of Lake Kewanee (Windfall Pond), clump in mud-hole on margin of wet woods, July 29, 1946, S. L. Glowenke 8052 (NYS, PAC). [Lackawanna Co.?:] Near Carbondale, Mud Creek, Aug. 1, 1897, D. L. Topping (US). Blair Co.: Bald Eagle Valley, 1865, J. R. Lowrie (PAC).<sup>2</sup>

Vegetatively *S. ancistrochaetus* may be distinguished from *S. atrovirens* by its narrower leaves, more ascending inflorescence rays, and larger, slightly mucronate scales. The flowers of *S. ancistrochaetus* have 6 perianth bristles which are rigid and barbed almost to the base with thick-walled, sharp-pointed, retrorse teeth; flowers of *S. atrovirens* have a variable number of perianth bristles (usually 4-6) which are delicate and often wrinkled, and the thin-walled, round-tipped, retrorse teeth are concentrated

<sup>2</sup>After submitting this manuscript, I found a specimen of *S. ancistrochaetus* from New York State: Washington Co.: W. Ft. Ann, Mt. Nebo, 1800 ft., wet place, Sept. 13, 1900, S. H. Burnham (CU).



PLATE 1266. Type specimen of *Scirpus ancistrochaetus*.

toward the tip of the bristle. The achenes of *S. ancistrochaetus* are about 1.25 mm. long and the portion above the locule is tough and thickened; achenes of *S. atrovirens* are about 1 mm. long and lack a tough, thickened portion above the locule. Some of these characteristics of *S. ancistrochaetus* and *S. atrovirens* are illustrated in figure 1.

*Scirpus polyphyllus* and *S. ancistrochaetus* have achenes which are almost the same length, but those of *S. polyphyllus* tend to be wider and less obovate. Also, *S. polyphyllus* may be distinguished from *S. ancistrochaetus* by its more mucronate scales and longer, more delicate bristles.

The bristles of *S. ancistrochaetus* are almost identical with those of *S. sylvaticus* L. of the Old World and its North American counterpart, *S. expansus* Fern. However, these species are easily distinguished from *S. ancistrochaetus* by their wider leaves, more branched inflorescences, blacker scales, and three-angled achenes. Many of the cells outside of the midrib in the scales of *S. ancistrochaetus* contain an orange pigment while these same cells in the scales of *S. sylvaticus* and *S. expansus* either contain a black pigment or lack pigment altogether. The achenes of *S. ancistrochaetus* are more plano-convex, with the dorsal angle not very conspicuous.

Some other interesting specimens have been turned up which appear to be robust forms of *S. ancistrochaetus*. Superficially the seeds appear to be normal, but closer examination reveals that they do not contain an embryo or an endosperm. A cytological examination of meiosis might prove very useful in ascertaining the relationship of this type to typical *S. ancistrochaetus*. It is known only from one locality: PENNSYLVANIA: Clinton Co.: 4 mi. n. of Loganton, in bog, Sept. 13, 1940, *H. A. Wahl 876* (GH, CU).

Hybrids between *S. ancistrochaetus* and *S. atrovirens* are morphologically intermediate between the two parents and have abortive seeds. Some of their characteristics are illustrated in figure 1, between those of the two parents. The criteria of assessing the hybrid nature of these plants are quite similar to those found in the study of *S. peckii* (Schuyler, 1961). Hybrids have been found in two localities: VER-

MONT: Windham Co.: 5 mi. n. of Bellows Falls, e. side of rt. 5, growing between populations of *S. ancistrochaetus* and *S. atrovirens* along margin of pool, Aug. 12, 1961, A. E. Schuyler 3453 (MICH). PENNSYLVANIA: Centre Co.: 3½ mi. s. of State College, Musser's Gap, June 13, 1914, A. R. Bechtel (PAC).

The distribution of *S. ancistrochaetus* and its hybrid with *S. atrovirens* in Pennsylvania (see figure 2) appears to be correlated with the western limits of the ridge and valley region. Some localities (Bald Eagle Valley and the Connecticut River valley) indicate that this species may occur primarily in lowland habitats in hilly country. The habitats, themselves, appear to be wetter than those of *S. atrovirens*.

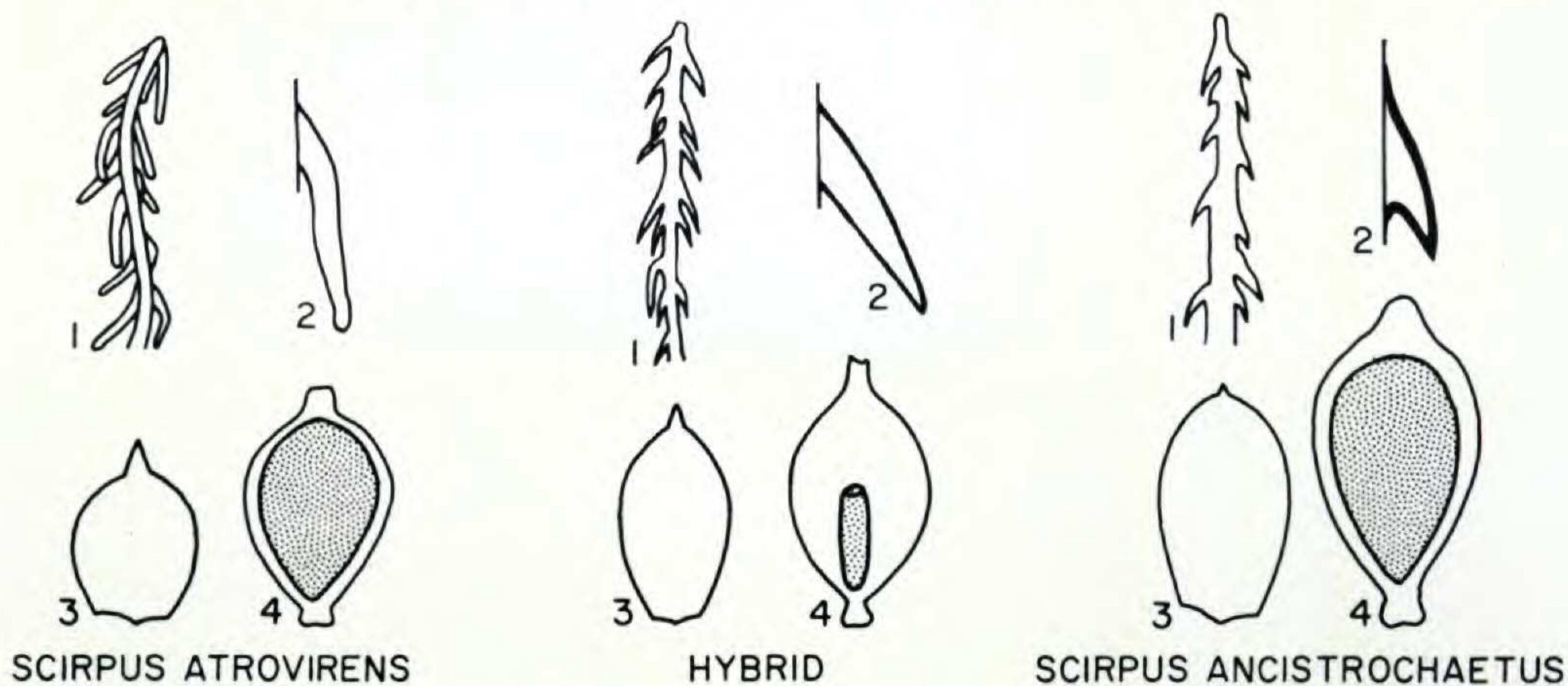


Figure 1: 1. Bristle tips, x 47. 2. Bristle teeth, x 190. 3. Scales, x 8.5. 4. Fruits with inclosed seeds (stipled), x 16.

In the Vermont locality, *S. ancistrochaetus* occurs along the margin of a pool and *S. atrovirens* occurs a short distance away from the margin. Herbarium labels on the Pennsylvania specimens also suggest a wetter habitat.

Because of the floristic affinity between Asia and North America in the genus *Scirpus* (Raymond, 1959), it was considered possible that *S. ancistrochaetus* also occurs in Asia. However, neither Koyama (1958) nor Raymond (1957, 1959) has mentioned or described any plants closely resembling *S. ancistrochaetus*.

The occurrence of *S. ancistrochaetus* in isolated localities in a region where the flora is relatively well known suggests that it may be a relict species. It is possible that in regions

where it does not now exist, it has made a permanent imprint on our flora through hybridization. For example, even though the  $F_1$  hybrids with *S. atrovirens* that I have discovered appear to be highly sterile, the possibility still remains that some individuals may be partially fertile and backcross with either parent. The backcross individuals may be extremely rare and quite sterile, but fertility may be

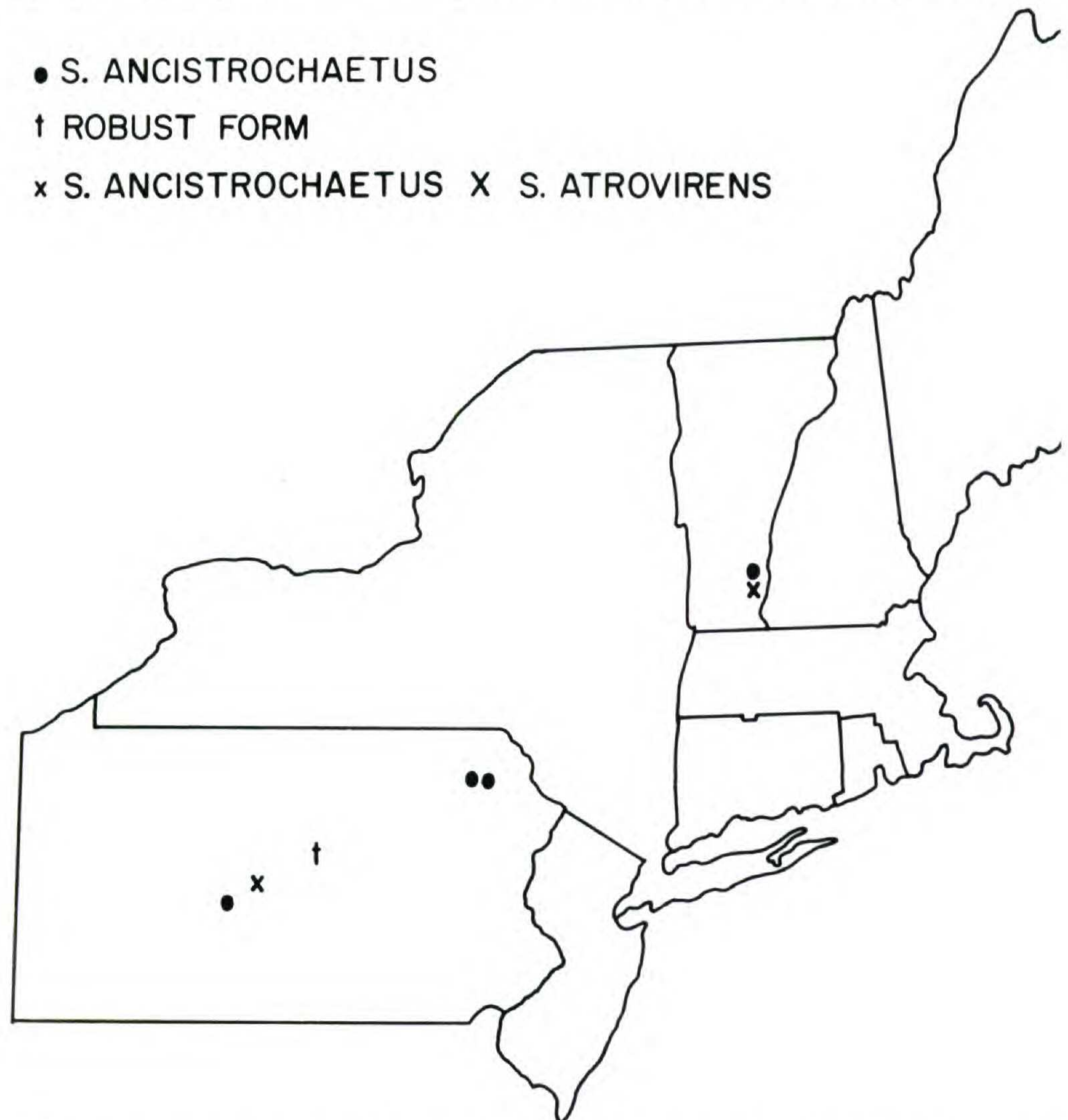


FIGURE 2: Distribution of *Scirpus ancistrochaetus*, including its robust form and its hybrid with *Scirpus atrovirens*.

gradually restored as the backcross individuals acquire more and more genes from one of the original parents, in this case *S. atrovirens*. These fertile individuals which result from backcrossing would make this original parent appear more polymorphic. I think that most taxonomists would agree

that *S. atrovirens* is morphologically variable; and Hicks (1928) has indicated that there is also substantial cytological variability. Some of this variability could be due to past hybridization of *S. atrovirens* with *S. ancistrochaetus*. —  
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## ACKNOWLEDGMENTS

I am grateful to P. A. Hyypio and S. J. Smith for their help in connection with my field work during the past three summers; and to E. G. Voss and W. H. Wagner, Jr. for their help with the manuscript.

## LITERATURE CITED

- FERNALD, M. L. 1950. Gray's Manual of Botany. 8th ed. American Book Co., New York.
- GLEASON, H. A. 1952. The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada. The New York Botanical Garden, New York.
- HICKS, G. C. 1928. Chromosome studies in the Cyperaceae with special reference to *Scirpus*. Bot. Gaz. 86: 295-317.
- KOYAMA, T. 1958. "Taxonomic study of the genus *Scirpus* Linné." Jour. Fac. Sci. Tokyo Bot. 7: 271-366.
- RAYMOND, M. 1957. Some new or critical *Scirpus* from Indo-China. Nat. Canad. 84: 111-150. (Mém. Jard. Bot. Montréal 48: 111-150).
- . 1959. Additional notes on some S. E. Asiatic *Scirpus*. Nat. Canad. 86: 225-242. (Mém. Jard. Bot. Montréal 54: 225-242).
- SCHUYLER, A. E. 1961. Evidence for the hybrid origin of *Scirpus peckii*. Rhodora 63: 237-243.

## A SURVEY OF THE ALGAE OF LAKE QUINSIGAMOND<sup>1</sup>

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This study of the fresh water algae of Lake Quinsigamond, Worcester, Massachusetts, was undertaken in order to identify the species, to investigate their distribution, and to compare the results with those of G. E. Stone in his paper "Flora of Lake Quinsigamond" published in 1900.

Stone listed 81 genera and 331 species of algae, excluding Diatoms, in his paper; the Desmids (including placoderm and saccoderm types) were the largest group, totalling 150

<sup>1</sup>Portion of a thesis submitted to the Department of Biology, Clark University, in partial fulfillment of requirements for the degree of Master of Arts. The thesis was undertaken under the direction of Dr. Vernon Ahmadjian.

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